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Aerospace Basic Doctrine

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AIR FORCE 2000

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(U) We in the Long Range Planning business are well aware of the skepticism towards predicting the future. The future is not preordained and the right or logical course of action is not self-evident. We must cope with the present to reach the future, but to survive over time, we must discern broad future trends and issues and adjust current actions accordingly. It is in this vein that I present to you a briefing on Project Air Force 2000, an Air Force Chief of Staff-directed initiative to investigate the operational environment which will confront the Air Force at the turn of the century.

Study Initiation

(U) Former Air Force Chief of Staff General Lew Allen directed this study in October of 1981 with the requirement for it to be Completed by June of 1982 and to keep it realistic and affordable.

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(U) While many past studies were restricted to an examination of future technological possibilities, this study takes a broader view by addressing economic, demographic, and environmental issues, as well as technological matters, to provide a more comprehensive picture of the operational context in which the Air Force of the future will carry out its missions.

(U) It is conservatively estimated that several hundred military and civilian personnel, as well as individuals from the private sector and other government agencies, contributed to the preparation of this study. The Air Staff panel chairmen for the eight Air Force 2000 subject areas conducted primary research and produced their chapter areas. Inputs to the study came from major commands, recognized air power visionaries, aerospace companies, academies, defense contractors, and more than seventy Air Force general officers.

(U) Midway through the study in March of 1982, a panel of 13 retired 3 and 4-star general officers was convened to initially review the first draft of the study report. As a result of this review, minor adjustments were made to four of the chapters.

What's in it?

(U) The chapters of the report cover the spectrum of environmental, economic, and strategy considerations and the

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final chapter draws the study together in a challenge, conclusions, and recommendation chapter. Appendices to the report include Air Reserve Forces and Force Structure. Major study themes reflect the increasing environmental complexity with resource competition, weapons proliferation and diffusion of power. There will be a need to operate across the spectrum of conflict and to fully utilize a global force projection capability. All of these study themes are reflected in a joint/combined operational context.

Operational Environment

(U) So let us look then at the first chapter of the report, the Operational Environment. The world of 2000 will present startling contrasts to the world of today. Nations will experience both rapid technological advancements and continuing problems with resource availability. Advances in computer systems, microelectronics, signal processing, communications, directed energy technology, and composite materials will enhance the economics and military forces of major industrial nations. Against these gifts of modern technology, the unresolved problems of over-population, food scarcity, inequitable wealth distribution, energy shortages, and struggles over natural resources, as well as many other critical problems, will stand out in stark contrast. The gap between the economic status of the "have" nations and that of the "have not" Third World nations will persist and probably widen in absolute terms. This is very

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likely to provide fertile ground for future conflict among nations. —

(U) Petroleum, metal, and mineral resources will increase in scarcity through the year 2000. With no major economic growth or extraction problems, consumption of oil will be nearly in balance with production. Known oil reserves will last for 50 years with another 50 years available based on potential reserves.

(U) Both the US and the Soviet Union can be energy independent in the year 2000. Access to mineral and metal resources will continue to be a critical issue with the USSR and Sub-Saharan Africa being the major suppliers. Strategies such as stockpiling, substitution, seabed mining, and in the out years, celestial mining, may provide some relief.

(U) The world's population will grow from the present 5 billion to 6 billion. The fastest growing areas will continue to be those that can least afford it — Asia, Africa and Latin America. Over-population and hunger in these areas will lead to low productivity, migration, and demographic imbalances.

(U) Deliverable nuclear weapons, which only a handful of nations currently have, could be possessed by many major powers and several minor powers by the year 2000. Further complicating the global environment, many Third World countries could have large quantities of military hardware embodying late 1970's and 1980's

technology. Tensions in less-developed countries could increase because of economic problems, political differences, and increasing internal involvement with outside powers. With the Soviet Union and some other nations attempting to undermine American influence throughout the world, the possibility of a peaceful global environment in the future seems remote.

(U) Finally, the medium of space will see increased interest over the next dozen years. Worldwide interest in space is apparent for commercial as well as military purposes.

(U) Whether in a low level, theater, or global confrontation, the Air Force must be prepared to deter war. And if deterrence fails, we must be able to "Fly, Fight, and Win."

Strategies, Concepts, and Capabilities

(U) The second and third chapters of the Air Force 2000 report articulate broad objectives, strategies, concept of operations, and capability requirements to guide the employment of US air power into the year 2000. Force flexibility across the spectrum of conflict is an absolute necessity to meet the operational environment described in the first chapter.

Low Level Conflict

(U) Low level conflict ranges from political unrest to small-scale regional conflict. The responsibility for deterring and defeating organized terrorism or insurgency will rest heavily on the nations involved. The current strategy of coalition-building, combined with a tailored, rapid-response capability, is well-suited for the year 2000. Above all, the Air Force must remain flexible. Peacetime support and training for friendly air forces, counter-terrorist/insurgency operations, crisis augmentation of friendly air forces, and special operations will be required capabilities.

(U) This strategy can be best attained through the development of well-organized, high and low-visibility military pre-conflict programs. These programs should be designed to counter anti-US influence and may also be the foundation for greater Air Force presence. Once conflict begins, the primary goal is to properly supplement the above initiatives with a well-conceived strategy for supporting indigenous efforts through the application of conventional and special operations forces.

(U) The capabilities required for future low level conflict include: enhancing the military capabilities of indigenous forces; establishing greater Air Force presence in countries or regions of strategic interest; and increasing territorial access for US conventional forces inside or outside these regions.

Soviet theater attacks with a combination of forward-deployed and CONUS-reinforcement forces will also continue. By improving standoff weapons, all-weather systems, specialized munitions, and real-time target location means, technology will magnify the destruction air power can deliver on enemy forces. The ability to continue operations in a chemical/nuclear-contaminated environment and to retaliate in kind must also be developed.

(U) To prevail in theater conflict, the Air Force must seize the initiative and quickly achieve both air and space superiority. Air superiority will require the capability to effectively attack and neutralize enemy airfields, destroy aircraft before they can employ their weapons, and destroy surface-to-air defenses. Space superiority is required to ensure that our space-based assets are available to support theater forces. Superiority in space will require a robust force structure and the capability to destroy hostile space systems.

(U) The ability of the Air Force to interdict land and naval forces will be crucial to the success of the theater campaign. To support ground forces, long range night/all-weather systems will be needed to interdict reserve forces and supplies before they can reinforce the front lines. These systems should have the flexibility to provide close air support. The inherent range and flexibility of land-based air power provide the capability to interdict hostile naval forces.

(U) The Air Force must also be able to generate large numbers of effective sorties. Therefore, the Air Force should develop highly reliable and supportable aircraft with the capability to operate from damaged runways; the capability to operate from dispersed, concealed locations in a high intensity conventional, chemical, or nuclear environment; and airlift and air refueling assets that are balanced with the fighting forces.

(U) In theater warfare, the objective will continue to be to deter chemical, biological, and nuclear conflict, while retaining the option to initiate use of appropriate tactical systems to back up US conventional forces. For deterrence to work, the enemy must know that the US has the ability to deny him the advantage in a chemical, biological, or nuclear engagement. Further, if deterrence fails and escalation is to be controlled after initial use of non-strategic nuclear weapons, the enemy must know that the US retains the capability to destroy his strategic assets.

(U) The extended combat radius and large payload of the strategic bomber force can provide the theater commander with a unique weapon system. Bombers can provide extended maritime support as well as deliver conventional firepower on land. The Air Force should strive for a bomber force of sufficient size and flexibility to provide for the theater support role.

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(U) To conclude the portion of this briefing dealing with strategies, concepts, and capabilities, it is important to note that:

- Our forces must have the flexibility to operate across the spectrum of conflict
- For low level conflict, our goal must be to support indigenous forces and improve their warfighting capability
- For theater conflict, we must seize the initiative and gain air and space superiority
- For strategic conflict, we must survive with sufficient forces for retaliation that permits the United States to achieve its objectives.

(U) The following five chapters of the Air Force 2000 report provide back up support to the preceding chapters. The first of these is on C³I.

C³I

(U) Air Force success in air warfare in the year 2000 will depend, in large part, on the operation of an integrated command, control, communications, and intelligence (C³I) system. This

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system will combine the functions of collecting, processing, transmitting, and applying essential information to manage and execute Air Force operations effectively. This essential information includes details about the enemy and friendly forces, logistics, weather, and personnel data.

(U) C³I problem areas noted in the study include decreased system survivability and the need for change of C³I management structure from what now exists. Additionally, problems of collection, processing, and data movement continue to grow in volume and rate. This unprecedented information volume can inundate the decision maker.

(U) To address the information movement problem, we must develop a proliferated and redundant blend of systems, from a simple device for secure telephone communications to cable, satellite, and microwave improvements. This redundant blend of systems will provide system survivability — something essential to both theater and strategic growth.

(U) Technological innovations to be expanded for information processing and movement include the use of expert systems and information storage systems.

(U) Expert systems will use artificial intelligence components that interact to solve complex problems, and make recommendations using varied data bases. These systems will interact in words

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and pictures with the decision maker to reduce the mass of lower level decisions and information flow.

(U) Other initiatives to reduce information movement are collection and consumer systems. In much the same way as a quarterback calls a coded play, a short digital message "token" would activate prestored activity in each of these collection systems, reducing overall information flow and optimizing user activity.

(U) The Air Force was an early leader in the integration of communication and computer systems. Initiatives in the management of these systems were few in the late 1970s and early 1980s, but there is now a definite push of technology in this area.

(U) Initiatives are needed to integrate computer and communications systems throughout the Air Force. This will involve management from the Secretariat level to the air base level, physical equipment design and arrangements, expanded and modified technical training, and the structuring of career fields.

(U) The Air Force's communications system will grow over the next decade into a single, distributed system that will carry information throughout the Air Force. This system will grow very quickly, and although it will absorb a great deal of money, it

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could well be the resource that provides the crucial technological advantage over potential enemies possessing quantitative superiority. This structure must promote the integration of information movement and information processing systems and guide development from a total system perspective.

(U) High technological growth, exemplified by the large capacity chips forecast for the 1990s, will make the requirement for greater integration of all data acquisition, processing, and movement functions even more vital than it is today. This is a case where rapid technological change is best accommodated through increased centralization.

Operational Support

(U) Operational support, discussed in the next chapter in terms of the functions of logistics and engineering, provides the integrated support processes, support resources, and support structures necessary to achieve an effective military capability. Two fundamental and enduring operational support objectives for the year 2000 are to deploy and employ responsive operational support forces worldwide and to sustain combat forces which can survive for the duration of conflict.

(U) Support requirements have evolved from the designs and employment concepts of the weapon systems being supported, and these designs have created manpower and equipment-intensive

support processes. The resultant fixed-site air base and industrialized support structure is highly vulnerable to combat disruption or destruction. Because of its vulnerability, relative immobility, and inflexibility, dependence on this fixed-site support structure limits the effective employment of air power.

(U) The Operational Support Strategy for the year 2000 and beyond focuses on reducing support structure vulnerability by emphasizing mobility, flexibility, and survivability. The strategy reduces support structure vulnerability by exploiting technology to enhance weapon systems reliability, maintainability, and support processes.

(U) Streamlined, mobile weapon system support, coupled with the inherent flexibility of decentralized operations, provide the opportunity to modify a support-driven basing structure. The Air Base Support Concept greatly expands the number of warfighting locations by using existing airfields or their equivalents. The ability to provide combat-configured support at vast numbers of dispersed operating locations is fundamental to the support strategy for the 21st century. With capabilities provided by the Weapon Systems Support and Support Mobility Concepts, air base support functions within the existing basing structure are reallocated to create satellite operating bases and main support bases. A dispersed air base structure evolves in which operations and support are performed in a manner prepared for warfighting.

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(U) The chapter concludes by emphasizing that a survivable support structure is the most critical support issue for the year 2000. Without survivable support, warfighting forces cannot be sustained in combat. While perhaps acceptable for peacetime, the current support structure, characterized by large size, high degree of industrialization, relative immobility, and extreme vulnerability, is ill-prepared for warfighting in the year 2000. The characteristics of support mobility, flexibility, and survivability will be essential for 21st century combat.

Recommendations are summarized as follows:

- Develop ways to reduce or eliminate combat dependence on a limited number of fixed-site air bases and their vulnerable support structures.
- Integrate weapon systems design, weapon systems employment concepts, and operational support strategies to achieve maximum combat effectiveness.
- Complement the inherent mobility of weapon systems with an equally mobile support structure.
- * - Organize support processes, support resources, and support structures for warfighting, and conduct peacetime operations within that warfighting framework.

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Technology

(U) The purpose of the Air Force technology program is to develop and field systems that support military requirements. The results presented in the Technology chapter are based on a perception of the world environment projected for the early 21st century and US national strategy translated into aerospace warfare doctrine and military requirements.

(U) Attention is focused on addressing a list of the highest priority military system capabilities that the technology community can relate to specific technologies currently within reach.

(U) Information presented in the chapter includes the definition of the capability, the mission and need it supports, current ability to meet the desired capabilities, and concepts and expected improvements. The treatment of each capability concludes with the identification of the technologies necessary to support the capability. Based on the criticality of the technologies that support each of the ten capabilities, 15 technologies are identified as having highest payoff. Five technologies are identified for early emphasis: information processing, sensors, supportable electronics, stealth, and lasers. The technology base clearly plays a vital role in the research and development process and its continued support is essential. In spite of determined efforts to strengthen the

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technology base investment, little growth has been seen. In real purchasing power, investment in the technology base is now at less than 60 percent of its level in the mid-1960s. We are mortgaging the future by undermining the infrastructure that has provided the qualitative edge found in the current generation of deployed systems. A real growth trend should be established now and continued to adequately address high-payoff technologies.

(U) It is clear that the Soviets are outspending us in R&D. Although their utilization of these funds may be less efficient than ours, through the sheer weight of their program they stand to realize payoffs in many technology areas over the next several years. If we are to remain in a position of technological equivalence, much less superiority, we must pursue a robust R&D program now, with continuity for the future funding years.

(U) The utility of the technology chapter lies in its recommendations on technologies to support today to ensure a balanced future capability in an uncertain world. The following recommendations are made based upon the analysis presented in the Technology chapter:

- The critical portions of the 15 highest payoff technologies which are for the most part in the Advanced Development phase, must be supported, with special emphasis on the five technologies presented above. This support is required in two areas: adequate growth in

real dollars to ensure that the potential which the technology offers is achieved, and protection of these funds to avoid programmatic instability.

- In order to ensure that the next generation of technology appears, a technology base must be funded with a substantial growth rate in real dollars. This will reverse the downward trend of the last 15 years and create the seed investment to ensure that the technology breakthroughs necessary to remain at the leading edge will in fact occur.
- The product of this chapter is only a first order attempt to address the complex issue of planning technology programs based on the best perception of the military need 10 to 20 years into the future. It is strongly recommended that this process be refined on a continuing basis. The goal is optimum expenditure of critical technology resources to best meet the needs of the Air Force.

Manpower, Personnel, and Training

(U) The principal challenges facing the Air Force in manpower, personnel, and training through the year 2000 focus on instilling and perpetuating a warfighting spirit and perspective among Air Force people. The ability to rekindle that innate spirit to

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fight and win will depend largely on Air Force leadership, whose challenge it will be to create an environment that builds the institutional values — loyalty, unit cohesion, esprit, and sense of purpose and dedication to the mission -- that have so often in history spelled the difference between victory and defeat.

(U) The future demand for people will be determined by the size of the force, the strategy it is called on to implement, and the weapons required by that strategy. The requirement for people is expected to grow 10 to 15 percent by the year 2000 with the mix of active, reserve, civilian, and contract personnel remaining similar to what it is today. A strategy calling for the global deployment of tailored forces may require more multi-skilled people able to operate independently in the demanding and rapidly changing battlefield environment of the future. New sophisticated weapons will also require people with higher technical aptitudes and skills.

(U) In the context of the overriding importance of the warfighting spirit, of strong and dynamic leadership, and of the perpetuation of institutional values, the chapter discusses the need for high quality people; the changing requirements for people due to new and evolving technology and missions; and the dynamic social, economic, and demographic factors that will influence the availability of people in the future. The discussion focuses on seven key manpower, personnel, and training

issues that will shape the Air Force through the end of this century. These issues are: Warfighting Perspective (the vital need to keep the orientation of the people on the mission); Leadership and Military Values (the presence of leadership as the cornerstone of military effectiveness); Compensation (the single factor that pervades all other issues, and ultimately determines the ability to attract, motivate, and retain Air Force people); Manpower Requirements (the need to be able to develop the optimum mix of people); Recruiting (the competition for high quality people); Training (changes necessitated by increasingly technologically sophisticated hardware); and Retention (keeping experienced and trained people in the Air Force). To present a context in which to discuss these seven issues, the chapter begins with an overview of the changing demand for people and the dynamic factors influencing the future supply.

(U) The growing demand for people will have to be met from a declining traditional recruiting cohort in an environment of increased competition from the private sector. The number of 18-year olds in the US will decline by some 20 percent by 1992 and remain below current levels until the end of the century. At the same time, the Air Force will be challenged to retain people in the face of an increasing demand from outside the Air Force for experienced people. Successful recruitment and retention will depend primarily on compensation -- both economic and non-economic -- providing a reasonable quality of life for the Air Force member and his or her family.

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(U) Total Force readiness through the year 2000 will depend on the interaction of recruiting, retention, training, and those aspects of personnel management which ultimately bind the individual to the mission. Molding this dynamic blend of people and technology into a cohesive, ready, and motivated fighting force will be the task of Air Force leadership, whose job it will be to instill and perpetuate essential military values and warfighting spirit among all Air Force people, and to ensure that they are compensated for the many sacrifices they make for their country.

Financial Planning

(U) The purpose of this chapter is to identify the anticipated economic and budgetary environment and its implications, and determine the initiatives that must be taken to provide the warfighting capability required entering the 21st century.

(U) Other chapters in the Air Force 2000 report identify numerous requirements and desired capabilities -- all of which require dollars. However, funding will be constrained by the US economic and budgetary environment. Data indicates that the US economy will experience a 2.6 to 2.8 percent average annual real growth through 2000, as opposed to the 3.3 percent enjoyed over the past 25 years. An even more important determinant of future defense funding levels is the budgetary and political-economic

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environment. The perception of the external threat drives allocation decisions, but that perception is also influenced by domestic considerations and precedents set by past levels of defense spending.

(U) Past patterns of DOD and Air Force funding provide indications of the reasonable nature of future financial planning. Since 1950, funding has peaked during wars and strategic build-ups; there has been no long-term growth trend. Moreover, growth cycles have not exceeded three years. Despite the unprecedented peacetime funding growth for the period 1979-82, the Program Objective Memorandum (POM) planning for continued substantial increases in almost all appropriations and major force programs reflects unbridled optimism unsubstantiated by either an analysis of the economic and budgetary environment or historical funding patterns.

(U) A financial strategy to get to 2000 is necessary to resolve the dilemma of requirements that exceed fiscal resources. A strategy must also be developed to master specific economic and budgetary environmental constraints. Specific aspects of the anticipated economic environment that will adversely affect the future Air Force include personnel, petroleum, industrial productivity, and inflation. Other aspects of the budgetary environment that have important implications for the future Air Force are base and headquarters support, research and development, and methods of financial planning.

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(U) Personnel: Past cost figures, coupled with current demographic trends, indicate personnel costs will grow substantially. For this reason, the Air Force needs to substitute capital for labor wherever possible by incorporating maintainability/reliability features into future systems, investigating further automation of manpower-intensive support areas, and so forth.

(U) Petroleum: Petroleum costs will grow at an average of 2 to 4 percent above the inflation rate through 2000. Ninety-two percent of Air Force petroleum is consumed in aircraft operations. By 2000, with no increase in efficiency or flying hours, aviation fuel will double or triple the 1982 level in constant dollars. The Air Force must therefore emphasize and fund petroleum conservation/efficiency projects in Planning, Programming, and Budgeting System (PPBS) exercises. An aggressive R&D effort aimed at developing fuel-efficient aircraft engines and modifying current engines for fuel efficiency, as well as developing the ability to use synthetic fuels in both future and current engines must be undertaken.

(U) Industrial Productivity: The annual rate of increase in industrial productivity has steadily declined since the 1950s. The rate is expected to climb and then stabilize at an annual increase of 1.7 percent through 2000. This rate of increase is significantly less than that experienced in the 1950s and

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1960s. This portends continued high cost of goods and services the Air Force purchases from the commercial sector. To reduce these costs, the Air Force must aggressively support Manufacturing Technology (ManTech) and Technology Modernization (TechMod) programs, as well as recent DOD acquisition process improvement initiatives.

(U) Inflation: Inflation rates should decline to 6 percent by 2000, but will remain difficult to predict. The Air Force has been losing approximately \$2 billion per year in buying power due to understated budget inflation rates. To obtain the buying power needed for force structure purchases, a statistically sound system for tracking the impact of inflation on Air Force appropriations must be developed.

(U) Base and Headquarters Support: The number of major installations has decreased 44 percent over the last 20 years. The related O&M and Military Personnel support costs have decreased 45 percent. Further squeezing in these areas to generate dollars for force structure procurement may be counterproductive unless accompanied by changes in the organizational structure. The Air Force should thoroughly review this structure, which is basically a legacy from the past, to seek possible ways to streamline it.

(U) Research and Development: US military R&D expenditures declined in the 1970s from their 1960s level (constant

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Military Uses of Space: 1946-1991

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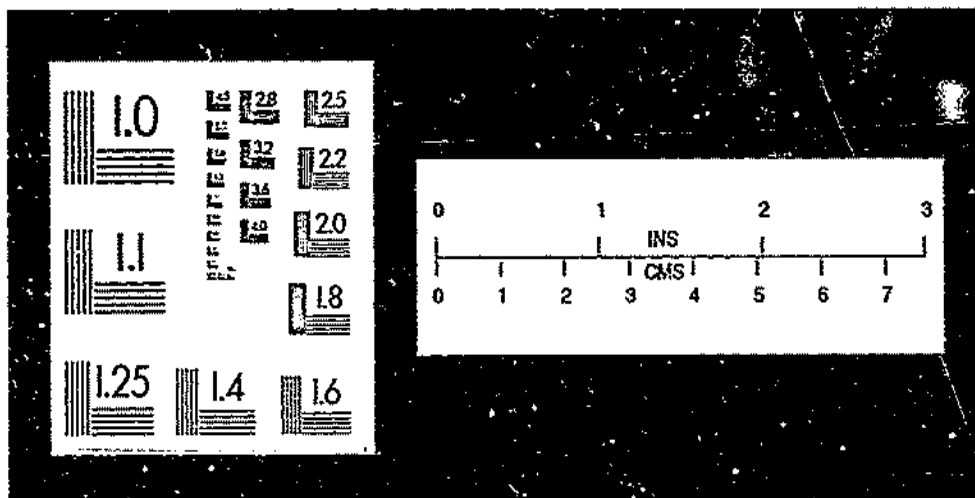
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dollars). Some turnaround has occurred in the 1980s. However, Soviet military R&D expenditures continue to exceed US expenditures. To maintain a technological edge, it is essential to have a robustly funded R&D program to exploit areas identified in the Technology chapter.

(U) Financial Planning System: From the standpoint of the anticipated economic and budgetary environment and a review of historical trends, the FY 1983-87 Force and Financial Plan (F&FP) (the down-payment on the 2000 force structure) appears over-optimistic and is therefore not a pragmatic guide for planning. The Air Force needs to make economic and budgetary environmental analysis part of the planning and programming process to determine possible future funding levels and specific environmental constraints. A POM should then be built for out years, and alternate funding level estimates should be made that incorporate the results of the environmental analysis, recognize the uncertainty of the future, and provide a pragmatic guide for future action.

(U) Strategy Principles: First, combat capability would be most quickly and cost-effectively enhanced by increased funding for readiness and sustainability. Second, a well-funded R&D program is a must since we have opted not to match the quantity of Soviet weapons. Third, programs that permit the Air Force to adapt to constraints identified in long range economic environmental analysis need to be funded. And fourth, the Air Force needs to

carefully prioritize mission and operational support capabilities to guide funding decisions.

Conclusions

(U) As we conclude this briefing on Project Air Force 2000, it is important to note that the Air Force faces a multitude of future problems, opportunities, and challenges. Some of these problems are more urgent than others. In many cases, development of strategies and operational concepts to resolve vital issues must begin immediately if the Air Force is to possess the necessary warfighting capabilities to defend the United States into the 21st century.

(U) Developing air and space power to its fullest potential must be our first priority. To realize this potential, it is imperative that the Air Force of 2000 be a flexible warfighting force. Flexibility must be emphasized in planning, organization, training, force employment, R&D, weapon systems decisions, and personnel considerations. In addition, we must stress joint operations for our fighting forces. Although roles and missions between the Air Force and our sister services may overlap, the fiscal realities and economy of force make stressing joint operations an absolute requirement for the immediate future.

(U) Finally, the Air Force 2000 study should be viewed as the first step in a continuing effort to investigate essential issues

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and trends influencing the political-economic military environment. In his 1942 book, Victory Through Air Power,

DeSeversky called for a nearly global projection capability -- up to 6,000 miles from the United States. This was beyond the realm of possibility at the time, but is now much closer to becoming a reality. The challenge is to ensure that long range capability without compromising combat capability. While the many issues identified in the course of Project Air Force 2000 are complex and difficult, the opportunities in the next two decades offer the promise of a challenging and exciting future. As in the past, the key to success or failure will depend heavily on the quality of people the Air Force attracts and the motivation, dedication, and vision of those people.